

Rhode Island Department of Environmental Management
2005 Air Pollution Inventory
Fuel Burning Form For Fuel Burned in Boilers



Facility Name

Address

Contact

Date

Phone

GENERAL PROFILE OF BOILER DATA FOR REPORTING YEAR 2005

No. of boiler stacks	
No. of functioning boilers	
No. of boilers added since Reporting Year 2004	
No. of boilers permanently retired since Reporting Year 2004	
No. of boilers connected via a breeching to 1 stack	
No. of boilers connected via another breeching to another stack	
No. of boilers using 1 fuel	
No. of boilers using 2 fuels	
No. of boilers using 3 fuels	
Other boilers (specify)	

Emission Factors for boilers typically installed in RI are listed on the back side of this page. These factors can be used to estimate your air releases. Air pollution control equipment, if any, would reduce your emissions according to its efficiency. The "S" beside the Emission Factor for SO_x indicates that you must multiply the Emission Factor by the % sulfur in the fuel burned.

For example, for #2 oil with a sulfur content of 0.3%, the emission factor becomes $144(.3) = 43.2$ pounds SO_x/1000 gallons of fuel oil burned.

The emission factors provided on the back of this page were published in AP-42, Chapters 1.3 and 1.4 in the February , 1998 revision.

NO_x emission factors were calculated based on average New England fuel bound nitrogen in residual oil as per guidance developed by NESCAUM (New England States for Coordinated Air Use Management.) The estimated emission rate from this nitrogen content is 0.5 Lb/MMBtu or 75 lb/1000 gallons of fuel burned. If your facility has analyses specific to its fuel oil supplies, the following equation may be used to determine the emission factor for #6 fuel oil NO_x emissions: $\text{lb NO}_x/1000 \text{ gallons} = 20.54 + 104.39(N)$.

Emission Factors are also available for other fuels such as waste oil, coal, wood, solid waste, etc. Please call for them if needed.

Return to: Air Pollution/Toxics Inventory, Office of Air Resources
 235 Promenade Street, Providence, RI 02908-5767

Air Pollution Inventory Form F2, page 1

Means that these emission factors and SCC Code(s) were applicable for estimating emissions from your facility for 2005

Classif./Fuel/Boiler info.	SCC Code	Total PM	SOx	NOx	VOC	CO	PM2.5 PRI*	PM10PRI*	NH3	Units "pounds per
Utility companies (SIC 4911)										
#6 oil, normal firing	1-01-004-01	9.19(S)+4.72	162.7(S)	75	0.76	5	6.407	8.791	0.8	1000 gallons
Nat. Gas/over 100 MMBtu/	1-01-006-01	7.6	0.6	280	5.50	84	7.6	1.9	3.2	Million cubic feet
Industrial Boilers (SIC 2000 - 3999)										
#6 oil/> 100 MMBtu/Hr	1-02-004-01	9.19(S)+4.72	162.7(S)	75	0.28	5	8.46	10.68	0.8	1000 gallons
#6 oil/< 100 MMBtu/Hr	1-02-004-02	9.19(S)+4.72	159(S)	75	0.28	5	8.46	10.68	0.8	1000 gallons
#4 oil/> 100 MMBTU/Hr	1-02-005-04	Emission factors fall between those for #6 and #2 fuel oil								
#4 oil/<100MMBTU/Hr	1-02-005-04	check your analysis								
#2 oil/> 100MMBTU/Hr	1-02-005-01	3.3	144(S)	24	0.20	5	0.25	1	0.8	1000 gallons
#2 oil/<100MMBTU/Hr	1-02-005-02	3.3	144(S)	20	0.20	5	0.25	1	0.8	1000 gallons
Nat. Gas/> 100 MMBtu/Hr	1-02-006-01	7.6	0.6	280	5.5	84	--	--	3.2	Million cubic feet
Nat. Gas/< 100 MMBtu/Hr	1-02-006-02	7.6	0.6	100	5.5	84	--	--	3.2	Million cubic feet
Nat. Gas/< .3 MMBtu/Hr	NA	7.6	0.6	94	5.5	40	--	--	3.2	Million cubic feet
Propane (LPG)	1-02-010-02	0.6	0.1(S)	19	0.5	3.2	--	--		1000 gallons
Commercial/Institutional Boilers (SIC 4000-4899, 4920-9999)										
#6 oil/> 100 MMBtu/Hr	1-03-004-01	9.19(S)+4.72	162.7(S)	75	1.13	5	4.36	9.2	0.8	1000 gallons
#6 oil/< 100 MMBtu/Hr	1-03-004-01	9.19(S)+4.72	159(S)	75	1.13	5	4.36	9.2	0.8	1000 gallons
#4 oil/> 100 MMBTU/Hr	1-03-005-04	Emission factor fall between those for #6 and #2 fuel oil								
#4 oil/<100MMBTU/Hr	1-03-005-04	check your analysis								
#2 oi/> 100MMBTU/Hr	1-03-005-01	3.3	144(S)	24	0.34	5	0.83	1.08	0.8	1000 gallons
#2 oil/<100MMBTU/Hr	1-03-005-01	3.3	144(S)	20	0.34	5	0.83	1.08	0.8	1000 gallons
Residential furnace	NA	1.7	144(S)	18	0.713	5	0.83	1.08	0.8	1000 gallons
Nat. Gas/> 100 MMBtu/Hr	1-03-006-01	7.6	0.6	280	5.5	84	--	--	0.49	Million cubic feet
Nat. Gas/<100 MMBtu/Hr	1-03-006-03	7.6	0.6	100	5.5	84	--	--	0.49	Million cubic feet
Nat. Gas/< .3 MMBtu/Hr	NA	7.6	0.6	94	5.5	40	--	--	0.49	Million cubic feet
Propane (LPG)	1-03-010-03	0.4	0.1(S)	14	0.5	1.9	--	--		1000 gallons

Note: If stack test or cem data are available they should be used in lieu of these factors. Please attach a copy of the stack test results or note if cem data were used.

Additional emission factors are available for controlled burners. Please contact the Office for these factors 222-2808 ext 7030

HAP emissions will be calculated for your facility using AP-42 factors.

*PM10 Primary and PM25 Primary factors assume 1% sulfur in fuel

STACK INFORMATION FOR BOILERS

Facility Name

Contact Name

Phone

This form has enough space to record data for up to 3 stacks and 3 boilers with 2 fuels apiece. You may photocopy this page to report additional equipment. For boilers using other fuels, RIDEM will supply a different form on request. If the information on this form has not changed since 2004, 2004 Form F2, page 2 may be copied and submitted for RY05. If one stack handles emissions from multiple boilers, report stack data only once. Show clearly which boilers are associated with each stack.

Attach summarized EPA Methods 1-7 stack test results if witnessed & approved.

‰ Necessary elements are checked. Others are for verifying emissions estimates.

‰	Stack number				
‰	Stack height above ground (ft.)				
‰	Stack diameter (ft.)				
	Stack exit temp (F)				
	Stack exhaust gas flow rate (acfm)				
	Smoke alarm/opacity monitor?	‰ Yes	‰ No	‰ Yes	‰ No
	NOx CEM?	‰ Yes	‰ No	‰ Yes	‰ No
	NOx control w/ ammonia or urea?	‰ ammonia	‰ urea	‰ ammonia	‰ urea
	Boiler number (what you call it)				
	RI DEM Approval No.				
	Installation date (year)				
	Boiler brand				
‰	Input: MMBtu/Hr		MMBtu/hr		MMBtu/hr
	Flue Gas Recirculation?	‰ Yes	‰ No	‰ Yes	‰ No
	Burner installation date (year)				
	Low NOx burner?	‰ Yes	‰ No	‰ Yes	‰ No
‰	Fuel type	# oil	natural gas	# oil	natural gas
‰	Oil sulfur limit (%)				
	Normal firing rate				
	Maximum firing rate				

EXAMPLE

STACK INFORMATION FOR BOILERS

XYZ Company
Facility Name

XXXXXXXXXX
Contact Name

111-1111
Phone

This form has enough space to record data for up to 3 stacks and 3 boilers with 2 fuels apiece. You may photocopy this page to report additional equipment. For boilers using other fuels, RIDEM will supply a different form on request. If the information on this form has not changed since 2004, 2004 Form F2, page 2 may be copied and submitted for 2005. If one stack handles emissions from multiple boilers, report stack data only once. Show clearly which boilers are associated with each stack.

Attach summarized EPA Methods 1-7 stack test results if witnessed & approved.

‰ Necessary elements are checked. Others are for verifying emissions estimates.

‰	Stack number	1			
‰	Stack height above ground (ft.)	135			
‰	Stack diameter (ft.)	3			
	Stack exit temp (F)	450			
	Stack exhaust gas flow rate (acfm)	1500			
	Smoke alarm/opacity monitor?	‰ Yes	‰ No	‰ Yes	‰ No
	NOx CEM?	‰ Yes	‰ No	‰ Yes	‰ No
	NOx control w/ ammonia or urea?	‰ ammonia	‰ urea	‰ ammonia	‰ urea
	Boiler number (what you call it)	1		2	
	RI DEM Approval No.	na		123	
	Installation date (year)	1966		May 1981	
	Boiler brand	B&W		Cleaver Brooks	
‰	Input: MMBtu/Hr	33 MMBtu/hr		18 MMBtu/hr	
	Flue Gas Recirculation?	‰ Yes	‰ No	‰ Yes	‰ No
	Burner installation date (year)	1983			
	Low NOx burner?	‰ Yes	‰ No	‰ Yes	‰ No
‰	Fuel type	# 6 oil	natural gas	# 6 oil	natural gas
‰	Oil sulfur limit (%)	1		1	
	Normal firing rate	82 gph	12,300 cu.ft/hr	45 gph	
	Maximum firing rate	220 gph	33,000cu.ft/hr	120 gph	

Approximate Conversions

Boiler Horsepower	x .0419	= MMBtu/hr (input)
1000 lb steam/hr	x 1	= MMBtu/hr
max. gph #2 oil	x .140	= MMBtu/hr
max gph #4 or #6 oil	x .150	= MMBtu/hr
gph #2 oil x 140	x 140	=ft3/hr natural gas
gph #4 or #6 oil	x 150	=ft3/hr natural gas

Facility Name

Contact Name

Phone

<<<<<<<< REPORT ONLY ONE FUEL PER COLUMN >>>>>>>>

Boiler No.				
RIDEM Approval No.				
Boiler Fuel Type				
Units (gal, cubic ft.)				
Month	Fuel burned		Fuel burned	
Jan 2005				
Feb 2005				
March 2005				
April 2005				
May 2005				
Quarterly Total		%		%
	No. of days		No. of days	
Jun 2005				
Jul 2005				
Aug 2005				
Quarterly Total		%		%
Sep 2005				
Oct 2005				
Nov 2005				
Quarterly Total		%		%
Dec 2005				
Dec+Jan+Feb (2005) Total		%		%
Annual Total		100 %		100 %
Total boiler fuel usage by fuel type for facility. Write units (gal., MMCF (million cu. ft.), MCF (thousand cu. ft.), CCF (hundred cubic feet))				
#6 % Sulfur		Natural Gas		
#4 % Sulfur		Liquid Propane		
#2 % Sulfur		Other: _____		
For #4 fuel burners only, please report blend and attach analysis: _____ %S (max.) _____ % #2 _____ % #6				